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Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.

2351-006

First Inventor or Application Identifier.

ROY V. PAULSON

Title

ELECTRIC-ARC RESISTANT COMPOSITION

Express Mail Label No.

EL300175606US

U.S. PTO
09/372371

08/11/99

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO:

Assistant Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

1. ☒ Fee Transmittal Form
(Submit an original, and a duplicate for fee processing)
2. ☒ Specification [Total Pages 13]
(preferred arrangement set forth below)
- Descriptive title of the Invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 USC) 113 [Total Sheets 1]
4. ☒ Oath or Declaration [Total Pages 3]
- a. ☒ Newly executed (original or copy)
 - b. ☐ Copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 17 completed)
[Note Box 5 below]
 - i. ☐ **DELETION OF INVENTOR(S)**
Signed statement attached in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
5. Incorporation by Reference (useable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

U.S. PTO
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6. ☐ Microfiche Computer Program (Appendix)
7. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
- a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy (identical to computer copy)
 - c. ☐ Statement Verifying identity

ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(b) Statement
(when there is an assignee) ☐ Power of Attorney
10. ☐ English Translation Document (if applicable)
11. ☒ Information Disclosure ☒ Copies of IDS
Statement (IDS)/PTO-1449 Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
14. ☒ Small Entity ☐ Statement filed in prior application
Statement(s) (2) ☐ Status still proper and desired
15. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. ☒ Other: Express Mail Certification

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: /

Prior application information: Examiner Group/Art Unit

18. CORRESPONDENCE ADDRESS

☐ Customer Number or Bar Code Label or ☒ Correspondence address below

(Insert Customer No. or Attach bar code label here)

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Registration No. (Attorney/Agent)

24,483

Signature

Lawrence A. Maxham

Date

11 AUGUST 1999

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NO.102 P004/004

PTO/USPO (12/97)

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**VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) & (b)) - INDEPENDENT INVENTOR**Docket Number (Optional)
2351-008Applicant or Patentee: ROY V. PAULSON ET AL.

Application or Patent No.: _____

Filed or Issued: _____

Title ELECTRIC-ARC RESISTANT COMPOSITION

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(e) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- ☒ the specification filed herewith with use as listed above.
☐ the application identified above.
☐ the patent identified above.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(e) if that person has made the invention, or to any person which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☒ No such person, concern or organization exists.
☐ Each such person, concern or organization is listed below:

FULL NAME: _____

ADDRESS: _____

☐ INDIVIDUAL☐ SMALL BUS. CONCERN☐ NONPROFIT ORGANIZATION

FULL NAME: _____

ADDRESS: _____

☐ INDIVIDUAL☐ SMALL BUS. CONCERN☐ NONPROFIT ORGANIZATION

Separate verified statements are required from each named person, concern or organization having rights in the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like are made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent in which this verified statement is directed.

ROY V. PAULSON
NAME OF INVENTORELIHU HOAGLAND IV
NAME OF INVENTOR_____
NAME OF INVENTORRoy V. Paulson
SIGNATURE OF INVENTOREli Hoagland IV
SIGNATURE OF INVENTOR_____
SIGNATURE OF INVENTORAUGUST 10, 1999
DATEAUGUST 10, 1999
DATE_____
DATE

DM (8-98)

PTO/SB/10 (12/97)

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**VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) & 1.27(c)) - SMALL BUSINESS CONCERN**Docket Number (Optional)
2351-008Applicant or Patentee: ROY V. PAULSON ET AL.

Application or Patent No.: _____

Filed or issued: HEREWITHTitle: "ELECTRIC-ARC RESISTANT COMPOSITION"

I hereby declare that I am

 the owner of the small business concern identified below:X an official of the small business concern empowered to act on behalf of the concern identified below:NAME OF SMALL BUSINESS CONCERN PAULSON MANUFACTURING CORPORATIONADDRESS OF SMALL BUSINESS CONCERN 46752 RAINBOW CANYON ROAD
TEMECULA, CALIFORNIA 92592

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that the rights under the contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

- X the specification filed herewith with title as listed above.
 the application identified above.
 the patent identified above

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention must file separate verified statement averring to their status as small entities, and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization having any rights in the invention is listed below:

- X No such person, concern or organization exists.
 Each such person, concern or organization is listed below:

FULL NAME: _____

ADDRESS: _____

☐ INDIVIDUAL☐ SMALL BUS. CONCERN☐ NONPROFIT ORGANIZATION

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING ROY V. PAULSONTITLE OF PERSON IF OTHER THAN OWNER VICE PRESIDENTADDRESS OF PERSON SIGNING 43752 RAINBOW CANYON ROAD, TEMECULA, CALIFORNIA 92592-5984SIGNATURE DATE AUGUST 10, 1999

ELECTRIC-ARC RESISTANT COMPOSITION

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to electric-arc resistant compositions, and more particularly, to a composition and process for manufacturing electric-arc resistant objects that are at least partially transparent.

2. Discussion of the Related Art

High voltage electrical equipment and other types of electrically powered devices pose a threat of powerful electric arcs or flashes. Electric arcs can occur when an individual is several feet away from the energized equipment. These arcs or flashes may result from short circuits developing from poor electrical grounding, failure of insulation, or by personnel working on or near energized electrical equipment and circuits. Electric arcs have extremely high temperatures of about four times the temperature of the sun's surface and their energy and radiation can result in immediate fatal burns. Firefighters, electric utility workers, factory workers and many other individuals are injured or killed every year from electric arcs.

In recognition of this electric-arc hazard, a wide variety of fabrics for protecting the body and extremities have been developed. Helmets and other types of headgear have also been developed to protect the head from electric arcs. However, little attention

has been given to an area of great need -- developing a substantially transparent technology that blocks, or absorbs electric arcs.

SUMMARY OF THE INVENTION

5

The present invention solves the problem of protecting individuals from electric arcs when working around high-voltage devices. Broadly, the present invention provides a composition that can be formed into a wide variety of substantially transparent objects that block electric arcs.

10 More specifically, one embodiment of the invention is a composition comprising at least one dye that blocks electromagnetic waves in the optical or infrared ranges, or both, and a substrate material. The substrate material and the dye or dyes are proportioned so that the composition ablates upon impact of electric arc energy.

15 One advantage of the present composition is that it can be formed into a wide variety of substantially transparent barriers that protect users from electric arcs while allowing clear vision through the barrier.

However, the claims alone -- not the preceding summary -- define the invention.

BRIEF DESCRIPTION OF THE DRAWING

The nature, goals, and advantages of the invention will become more apparent to those skilled in the art after considering the following detailed description when read in connection with the accompanying drawing – illustrating by way of example one product which can be found employing the principles of the invention. The single figure is a perspective view of one embodiment of the composition in the form of a face shield mounted on a helmet.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Definitions

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as is commonly understood by one of skill in the art to which this invention belongs. In event the definition in this section is not consistent with definitions elsewhere, the definitions set forth in this section will control.

As used herein, transparent or substantially transparent refers to a material characteristic that allows the passage of a sufficient amount of light to allow a person looking through the material to view objects under normal working conditions.

As used herein, IR/optical dye is one or more dyes that block at least part of the ultraviolet, or visible, or infrared sections of the electromagnetic wave spectrum.

As used herein, ablate, ablates, or ablation refers to the dissipation of energy by evaporating, vaporizing, or melting.

Composition

Throughout this description, the preferred embodiment and other embodiments should be considered as exemplars, rather than as limitations to the present invention.

5 The composition according to the present invention, when manufactured into products, provides a substantially transparent barrier that protects individuals from electric arcs.

10 One embodiment of the composition comprises an IR/optical dye blended with a substrate material. The IR/optical dye employed in the composition is comprised of an optical pigment and a separate infrared dye. Preferably, the optical pigment is substantially orange and ideally, the pigment used is Transparent Orange, color number 10017937, manufactured by M.A. Hanna Color of San Fernando, California. Alternative optical pigments, or other dyes that block a portion of the visible electromagnetic wave spectrum can also be used.

15 Preferably a broad spectrum infrared dye is employed, but other infrared dyes may be used. An ideal embodiment of the present invention uses Epolight III-125 Broad Band Infrared Absorption Dye, manufactured by Epolin, Inc., of Newark, New Jersey.

20 The substrate, or foundation material is a major constituent of the composition, and preferably is a plastic, or other suitable material. Ideally, the substrate material is Eastman Tenite Propionate 360 Formula – a cellulose acetate-propionate, manufactured by Eastman Chemical of Kingsport, Tennessee. Alternative substrate materials may be

selected from the families of cellulose, vinyls, polycarbonates, acrylics and LEXAN (LEXAN is a trademark of the General Electric Company of Schenectady, New York). A more detailed, but not exhaustive, list of alternative foundation, or base materials includes: acrylonitrile-butadiene-styrene, cellulose acetate, cellulose butyrate, ethylene-
5 methyl acrylate, ethylene-vinyl acetate, ionomer, methyl methacrylate/ABS, methacrylate-butadiene-styrene, polyarylate, polycarbonate, polychlorotrifluoroethylene, polycyclohexylene dimethylene terephthalate, polyetherimide, polyethersulfone, polyethylene terephthalate, polyethylene terephthalate glycol comonomer, polymethyl methacrylate, polymethylpentane, polyphthalate carbonate, polysulfone,
10 polyethersulfone, polystyrene, polytetrafluoroethylene, polyurethane, polyvinyl chloride, polyvinylidene chloride, polyvinylidene fluoride, styrene-acrylonitrile, styrene-butadiene styrene, styrene ethylene butylene styrene, silicone, styrene maleic anhydride, styrene, methyl methacrylate copolymer, thermoplastic rubber, polyamide, and TEFLON (TEFLON is a trademark of E.I. du pont de Nemours and Company).

Additional ingredients can be employed in the composition for increasing the durability of the final product, or for helping the individual ingredients to mix together, or to help the composition flow into a manufacturing mold. Dispersants can also be added to the composition to aid in blending the ingredients.

These additional ingredients may include: plasticizers, petroleum derivatives, and lubricants. A preferred embodiment of the composition employs a plasticizer mixed into the substrate material. An ideal embodiment substrate material comprises about 14%

plasticizer. The ideal embodiment also uses mineral oil, a petroleum derivative, to help the individual ingredients mix, and zinc stearate, a lubricant, to help the mixture flow during the manufacturing process. The plasticizer may also be employed to facilitate mixing, and improve the flow characteristics of the composition.

5

One presently preferred composition of the present invention comprises: 0.75 pounds of orange optical pigment; 30 pounds of cellulose acetate-propionate containing 14 percent plasticizer; 22 grams of broad spectrum infrared dye; 2.75 grams of mineral oil; and 10 grams of zinc stearate. Other variations of the composition may change the amount of each ingredient, or substitute specific ingredients. With the specific composition identified above, functionally effective ranges, or an operative amount, of the components may be easily determined by one of ordinary skill in this technical field.

Product

The composition of the present invention provides a level of protection from electric-arc energy previously thought unachievable with transparent products. It is believed that the invention first blocks the harmful portion of the electromagnetic spectrum, while almost simultaneously absorbing the electric arc energy by ablation. As the ablation continues, the amount of protection increases, as the product becomes more opaque to the energy. It has also been theorized that the ingredients of the composition synergistically combine to achieve these extraordinary results.

The composition described above is processed into products by blending the ingredients together and subjecting the blend to curing conditions. The curing may take place in an injection mold, or other suitable apparatus. The curing may comprise heating the mixture to a specific temperature, before or during or after, a shape-forming process like molding, compressing or the like. Alternatively, curing may comprise adding a catalyst to the composition, causing the ingredients to harden so that they can maintain a constant shape.

An envisioned, but by no means complete, list of products manufactured from the composition can include: face shields, multi-layered face shields, barriers, multi-layered barriers, screens, multi-layered screens, windows, multi-layered windows, eyewear and multi-layered eyewear.

One example of an envisioned face shield product is illustrated in the figure. Face shield 10 is attached to a hard hat or other type of headgear and protects users from electric arcs while at the same time allowing the user to view objects under normal lighting conditions. Alternative embodiments of the face shield, or other products, can have an anti-fog coating to prevent fogging of the product. An ideal embodiment would also be dielectric, that is, a non-conductor of electricity.

One embodiment of a face shield made of the composition of the present invention blocks the electromagnetic wave spectrum from about 200 nanometers (nm) to about 500 nm, and from about 800 nm to about 1800 nm. In other words, the face shield

is permeable to electromagnetic waves ranging from about 500 nm to about 800 nm. A face shield so constructed having a thickness of about 0.070 inches, can absorb up to about 40 calories per square centimeter. Alternative embodiments may be thinner or thicker, and may comprise one or more layers of material, with or without gaps between the layers. Other embodiments may block, or be permeable to, different parts of the electromagnetic wave spectrum.

A preferred embodiment face shield made of the above-described composition allows about 45% of 600 nm frequency light to pass through to the user. Other embodiments may be permeable to more or less light, to suit various tasks performed by users employing the product.

Other embodiments

Certain preferred embodiments have been described above. It is to be understood that a latitude of modification and substitution is intended in the foregoing disclosure, and that these modifications and substitutions are within the literal scope – or are equivalent to – the claims that follow.

Accordingly, it is appropriate that the following claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein described.

CLAIMS

What is claimed is:

1. A composition comprising:

2 a first dye that blocks electromagnetic waves in at least one of the following
regions: visible and infrared; and

4 a substrate material, the substrate material and the first dye being chosen and
proportioned so that the composition ablates upon impact of electric energy.

2. The composition according to claim 1, wherein the composition also

2 blocks electromagnetic waves.

3. The composition according to claim 2, wherein the electromagnetic waves

2 blocked range from about 200 nm to about 500 nm.

4. The composition according to claim 2, wherein the electromagnetic waves

2 blocked range from about 800 nm to about 1800 nm.

5. The composition according to claim 1, wherein the first dye blocks a

2 portion of the visible electromagnetic wave spectrum.

6. The composition according to claim 1, and further comprising a second dye, wherein the second dye blocks a portion of the infrared electromagnetic wave spectrum, and the first dye blocks a portion of the visible electromagnetic wave spectrum.

7. The composition according to claim 1, wherein the first dye blocks a portion of the infrared electromagnetic wave spectrum.

8. The composition according to claim 1, and further comprising a second dye, wherein the second dye blocks a portion of the visible electromagnetic wave spectrum, and the first dye blocks a portion of the infrared electromagnetic wave spectrum.

9. The composition according to claim 1, wherein the substrate material is selected from the group consisting of cellulose, vinyls, polycarbonates and acrylics.

10. The composition according to claim 1, and further comprising a plasticizer.

11. The composition according to claim 1, and further comprising a petroleum derivative

12. The composition according to claim 1, and further comprising a lubricant.

13. The composition according to claim 1, wherein the composition is formed

2 into a product.

14. A composition resistant to an electric-arc comprising:

2 an IR/optical dye; and

a substrate material, the IR/optical dye and substrate material being chosen and

4 proportioned so that the composition blocks electromagnetic waves and ablates when
struck by electric arcs.

15. The composition according to claim 14, wherein the IR/optical dye is

2 selected from at least one of the group consisting of optical dyes and infrared dyes.

16. The composition according to claim 14, wherein the IR/optical dye is

2 substantially orange.

17. The composition according to claim 14, wherein the substrate material is a

2 cellulose acetate-propionate.

18. The composition according to claim 14, and further comprising a

2 plasticizer.

19. The composition according to claim 14, and further comprising a

2 dispersant.

20. The composition according to claim 19, wherein the dispersant is a

2 petroleum derivative.

21. The composition according to claim 14, and further comprising a

2 lubricant.

22. The composition according to claim 21, wherein the lubricant is a zinc

2 stearate.

23. The composition according to claim 14, wherein the composition is

2 formed into a product.

24. The composition according to claim 23, wherein the product is selected

2 from the group consisting of at least face shields, multi-layered face shields, barriers,
multi-layered barriers, screens, multi-layered screens, windows, multi-layered windows,
4 eyewear and multi-layered eyewear.

25. A process for producing an electric-arc resistant composition comprising:

2 blending an IR/optical dye with a substrate material; and
subjecting the blend to curing conditions.

26. A product formed by the process of claim 25.

ELECTRIC-ARC RESISTANT COMPOSITION

ABSTRACT OF THE DISCLOSURE

5

Substantially transparent compositions that block electric-arc energy. A process of making the compositions comprise blending an IR/optical dye with a substrate material and subjecting the blend to curing conditions. Products manufactured from the composition ablate upon impact of electric-arc energy.

10

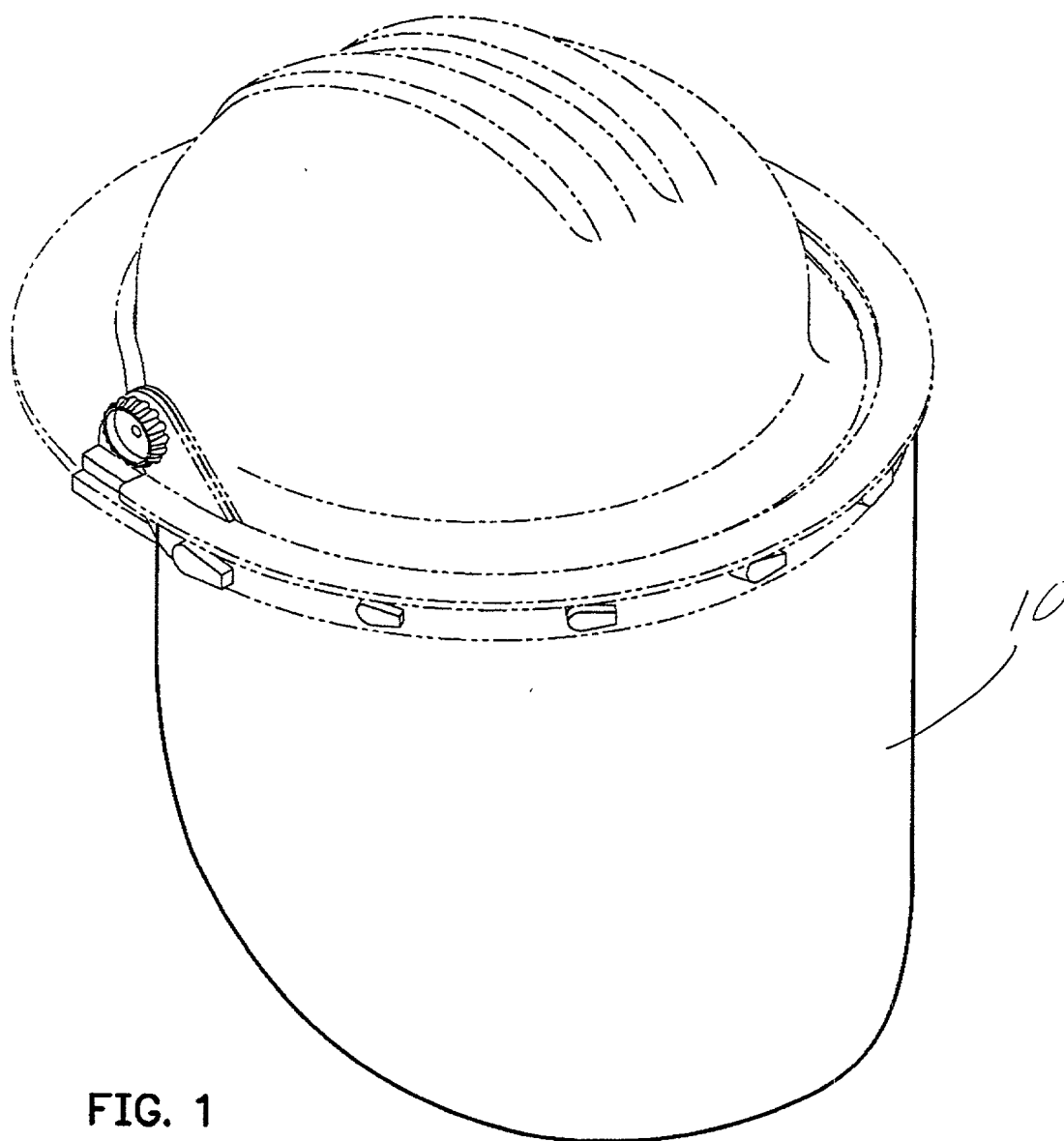


FIG. 1



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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION

Attorney Docket No.	2351-006
First Named Inventor	ROY V. PAULSON
COMPLETE IF KNOWN	
Application Number	TO BE ASSIGNED
Filing Date	HEREWITH
Group Art Unit	UNKNOWN
Examiner Name	UNKNOWN

☒ Declaration Submitted with Initial Filing OR ☐ Declaration Submitted after Initial Filing

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

"ELECTRIC-ARC RESISTANT COMPOSITION"
(Title of the Invention)

the specification of which

☒ is attached hereto

OR
was filed on (MM/DD/YYYY) _____ as United States Application Number or PCT International Application Number _____ and was amended on (MM/DD/YYYY) _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by an amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations § 1.56.

I hereby claim foreign priority benefits under Title 35 United States Code § 119 (a)-(d) or § 365(b) of any foreign applications for patent or inventors certificate, or § 365(a) of any PCT international application which designated at least one country other than the United States of America listed below and have been identified below by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Numbers	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached	
				Yes	No
			—	—	—
			—	—	—
			—	—	—
			—	—	—
			—	—	—

____ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional applications listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	____ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto

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NO.102 P002/004

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DECLARATION – Utility or Design Patent Application

I hereby claim the benefit under Title 35, United States Code § 120 of any United States application(s), or § 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States PCT international application in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application Number	PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Customer Number → Place Customer Number Bar Code
OR
☒ Registered practitioner(s) name/registration number listed below Label here

Name	Registration Number	Name	Registration Number
BAKER, Freiling E. MAXHAM, Lawrence A.	24,078 24,483	MARTÍNEZ, Peter R. ROBBINS, Steven J. WOYCECHOWSKY, David B.	42,845 40,299 39,079

Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto

Direct all correspondence to: Customer Number OR ☒ Correspondence address below
or Bar Code Label

Name	LAWRENCE A. MAXHAM				
Address	BAKER & MAXHAM				
Address	750 "B" Street, Suite 3100				
City	San Diego	State	California		92101
Country	USA	Telephone	(619) 233-9004		(619) 544-1246

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor:	<input type="checkbox"/> A petition has been filed for this unsigned inventor				
Given Name (first and middle (if any))	Family Name or Surname				
Roy Victor	Paulson				
Inventor's Signature				Date	AUGUST 10, 1999
Residence: City	TEMECULA	State	CALIFORNIA	Country	U.S.A.
Street Address	48752 RAINBOW CANYON ROAD				
Post Office Address	48752 RAINBOW CANYON ROAD				
City	TEMECULA	State	CALIFORNIA	ZIP	92592
				Country	U.S.A.

☒ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto

[Page 2 of 2]

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DECLARATION				ADDITIONAL INVENTOR(S) Supplemental Sheet Page 1. of 1.			
Name of Additional Joint Inventor, if any:				A petition has been filed for this unsigned inventor			
Given Name (first and middle (if any))				Family Name or Surname			
ELIHU				HOAGLAND IV			
Inventor's Signature				Date	AUGUST 10, 1999		
Residence: City	LOUISVILLE	State	KENTUCKY	Country	U.S.A.	Citizenship	U.S.A.
Street Address	4839 LOR ANN AVENUE						
Post Office Address	4839 LOR ANN AVENUE						
City	LOUISVILLE	State	KENTUCKY	ZIP	40219	Country	U.S.A.
Name of Additional Joint Inventor, if any:				A petition has been filed for this unsigned inventor			
Given Name (first and middle (if any))				Family Name or Surname			
Inventor's Signature				Date			
Residence: City		State		Country		Citizenship	
Street Address							
Post Office Address							
City		State		ZIP		Country	
Name of Additional Joint Inventor, if any:				A petition has been filed for this unsigned inventor			
Given Name (first and middle (if any))				Family Name or Surname			
Inventor's Signature				Date			
Residence: City		State		Country		Citizenship	
Street Address							
Post Office Address							
City		State		ZIP		Country	
Name of Additional Joint Inventor, if any:				A petition has been filed for this unsigned inventor			
Given Name (first and middle (if any))				Family Name or Surname			
Inventor's Signature				Date			
Residence: City		State		Country		Citizenship	
Street Address							
Post Office Address							
City		State		ZIP		Country	